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ABSTRACT

The School Board of Virginia Beach has conducted a two-year pilot program focusing on elementary school students who attend school 45 days and break 15 days year round. Four principal questions were proposed and researched by various independent agencies: (1) What effect does the 45-15 cycled-attendance year-round operation have on pupil achievement in reading and mathematics? (2) What effect does the 45-15 cycled attendance year-round have on the way pupils feel about school? (3) What effect does the first grade entry under the 45-15 calendar have on reading readiness? (4) What effect does experience with the 45-15 cycled attendance year-round plan have on parent attitudes? In addition, serious attention has been given to the operational and capital costs of the 45-15 experimentation. (BJG)

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A RESEARCH DESIGN FOR YEAR-ROUND EDUCATION

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The Virginia Beach, Virginia
Pilot Program of 45-15 Cycled Attendance

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INTRODUCTION

The research design for the evaluation of the 45-15 Pilot Program of Year-Round Education in Virginia Beach, Virginia evolved from an official policy statement adopted by the School Board. The statement reads in part:

> The School Board of the City of Virginia Beach . . . recognizes that policy decisions relative to wide-spread implementation of the plan must be based on firm evidence of the effects of the plan on student achievement and attitude, parental attitude, and cost.
>
> . . . To determine the effects of the 45-15 plan on this school division, the School Board directs the Division Superintendent and his staff to design, implment, and evaluate a two-year pilot program in four elementary schools. The School Board, further, provides for and encourages such program resource, policy, and procedure modifications as may be necessary to insure the most valid and unbiased evidence of the effects of cycled-attendance . . .

With this policy statement as a guideline, the research model for the operational phase of the 45-15 cycled-attendance pilot program was designed to answer the following questions:

1) What effect does the 45-15 cycled-attendance year-round operation have on pupil achievement in reading and mathematics?
2) What effect does the 45-15 cycled-attendance year-round operation have on the way pupils feel about school?
3) What effect does the early first grade entry under the 45-15 calendar have on reading readiness?
4) What effect does experience with the 45-15 cycled-attendance year-round plan have on parental attitudes toward the plan?

5) What effect does the 45-15 cycled-attendance year-round operation of schools have on operational and capital expenditures?

This publication is a synthesis of the research activities to be conducted by independent research agencies to answer these questions.

Evaluation of Pupil Achievement and Attitude Toward School

Research Agent: Educational Testing Service of Princeton, New Jersey

Principal Investigators: Jimmie C. Fortune and Donald E. Powers

Excerpts from Research Proposal:

. . . since there is strong reason to believe that, with the exception of first grade, all of the other grades will be affected similarly, the proposal seeks to limit the study to a fourth grade and a first grade sample to be studied longitudinally over the two-year period. The first grade will be studied since the change in age at which pupils enter school under the 45-15 school year plan may be particularly important at this level. The effects of treatment conditions and potential treatment interactions with reading readiness will be studied. The fourth grade was selected because: (1) it was felt to be representative, (2) state assessment data is collected at the fourth and sixth grades providing a check across tests at grade 4, 1973 and then at grade 6, 1975, (3) achievement changes can be viewed both longitudinally and cross-sectionally on the same grade level, and (4) both sampling and testing capabilities are optimized with this group.

In the first grade study, the primary interest will be reading readiness. The pupil effects that will be measured for the fourth grade study include achievement in reading, achievement in the learning of mathematics concepts, pupil attitude toward school, and pupil attitude toward learning.

For each variable change from pretest to first year posttest (1974) and ultimately to second year posttest (1975) would be ascertained for a sample of YRE school children and for a sample of children from two control schools.

SAMPLING PLAN

The design is made up of four experimental schools and two control schools whose designation was made without apparent bias. The two control schools, Lynnhaven and Brookwood, had a February 1, 1973, fourth grade enrollment of 239 pupils; the four experimental schools, Plaza, Windsor Woods, Windsor Oaks, and Holland had a total enrollment of 565 pupils on that date.

Original plans called for sampling 200 students from the control schools and an equal number from the experimental schools. Since the fourth grade enrollment at the control schools is only slightly above the originally proposed number, all of the fourth grade students in these schools will be tested in the interest of administrative convenience. A spaced sample of about 220 students has been chosen from the experimental schools. Each school is equally represented in this experimental sample.

The size of the sample chosen is large enough for testing differences between schools and extended school year groups in addition to testing for differences between treatments (length of school year). It is also sufficiently large to withstand anticipated sample mortality.

ACHIEVMENT QUESTION

The first question to be dealt with is change of achievement in two areas, reading and mathematics, as seen longitudinally. The sample would be given a battery of tests over the two-year period to look at achievement changes, both within groups and across ability levels. In April, 1973, the sample would be administered the SCAT Series II 4A, the STEP Series II 4A Reading and the STEP Series II 4A Mathematics Concepts. In April, 1974 STEP

Series II 4B Reading and STEP Series II 4B Mathematics Concepts would be administered. In April, 1975 the STEP Series II 4A Reading and Mathematics tests would again be administered along with the SCAT Series II 4B tests. As part of the state testing program the sample will take the Fourth Grade SRA Achievement and Ability Test battery in March, 1973 and the Sixth Grade SRA tests in March, 1975.

This battery of tests allow for both a linear systems analysis and a treatment-aptitude interaction analysis of both sets of achievement data. In the linear systems analysis, time-in-school, appropriate (Quantitative for Mathematics - Verbal for Reading) SCAT scores, and beginning achievement levels (1973 pretests) would be residualized out of both the 1974 and 1975 achievement scores. Tests of three basic hypotheses will be made using the two data points as replication. The null hypotheses to be tested are: (1) there is no significant difference ($p < .10$) in the achievement residuals on either reading or mathematics between the pupils attending the traditionally scheduled schools and pupils attending the schools on the extended year schedule; (2) there is no significant difference ($p < .10$) in the achievement residuals on either reading or mathematics between the pupils in each of the six schools; and (3) there is no significant different ($p < .10$) in the achievement residuals on either reading or mathematics between the pupils attending extended school year programs at different group times.

In order to estimate the contextual validity of the STEP tests, teachers of the students being tested will be asked to rate each test item on its importance to her class, to state whether or not the item was taught in the class, and to estimate whether or not a typical child in the class will be able to answer the items correctly.

A further analysis of achievement differences for this group of fourth graders can be made in 1974 and then replicated in 1975. Using the SCAT scores as aptitude data (Verbal for Reading; Quantitative for Mathematics), the

two school-year schedules as treatments (nine-month traditional and the "45-15" extended school year), and the achievement test scores adjusted for time-in-school, a treatment-aptitude interaction analysis can be made to see if disordinal interaction may occur showing a treatment bias in favor of a particular aptitude-level group.

A cross-sectional study of achievement can be made using the state achievement testing program scores (SRA's) for the fourth and sixth grades. An analysis of variance or covariance (using 1973 SRA pretests) can be computed across both fourth grade and sixth grade tests given in control and treatment schools in 1974 and again in 1975. Cross-validation of these achievement estimates can be made using the fourth grade sample STEP 1973 pretests with the 1973 SRA assessment tests and again using the fourth grade (now sixth grade) STEP 1975 with the 1975 SRA assessment test.

READINESS QUESTION

As part of the optional state testing programs Metropolitan Reading Readiness tests are given to first grade students in March, 1973. These test scores will be acquired for both the control and experimental schools. In addition to the readiness scores, entry ages of all first graders in the two sets of schools will be gathered. In September, 1974, the same group of pupils who were tested in 1973 will be given the Kuhlman-Anderson Intelligence Test (Form B) as second graders. Residuals of readiness scores after corrections for IQ have been made will be tested for differences across half-year divisions of age. Interaction tests should indicate whether or not the early beginning resulting from treatment requirements affects reading readiness as measured by the Metropolitan. In addition to the variables mentioned above, data on previous kindergarten experience as well as previous experience

in taking the Metropolitan Readiness Tests will be gathered and used in the linear systems analyses.

PUPIL ATTITUDE QUESTION

Another question of interest is whether or not the extended school year program affects the way pupils feel about school. Two attitude scales from the IDEA Affective Instrument Package will be administered to the fourth grade sample to determine if general attitude toward school and learning are affected by the change. The same linear systems analysis designed for the longitudinal analysis of achievement will be used to test for differences across treatments, schools, and attendance groups.

Evaluation of the Operational and Capital Cost Effects of the 45-15 Expenditures

Research Agent: The Institute for Social Analysis - New York, New York

Principal Investigators: Donald M. Levine and Francis A. J. Ianni

Excerpts from Research Proposal:

. . . the central objective of the ISA Study may be stated as follows.

> To determine the way in which the 45-15 Cycled Calendar (Pilot Program) has affected the capital and operating budgets of the Virginia Beach Public Schools

In order to fully deal with the impact on capital and operating budget, it will also be necessary to determine the following:

a.) the resource and cost base case-- school normal operation
b.) the incremental change for the pilot schools during the test operation--the 45-15 schools
c.) the effect of changing enrollment over time on the cost and resource modeling for the pilot schools
d.) the effect of extending the implications of the pilot school analysis to the entire group of schools in the Virginia Beach System during the test period and over a period of five years or more

. . . in order to analyze the 45-15 Pilot Program, standard principles of cost and resource analysis will be used such as cost and resource modeling, the construction of basic cost estimating relationships, the analysis of cost and resource variance, the projection of policy implications based on the

modeling and simulation results.

. . . Activity I: Establish a Profile of Resource Demands Prior to Conversion to 45-15.

Generally, it will be our purpose in this part of the study to define reliable sets of baseline information which can be used in the other activities. These sets of baseline information deal with the school program, resource demands related to each program, related dollar costs, and resource inventories.

. . . Activity II: Extrapolate Resource Demands Based Upon the Pro file Developed Under the Traditional Schedule.

In order to project the resource demands (quantity, type, and dollar costs) upon the school district under the traditional schedule, two additional types of information will be needed to be generated: enrollment projections for five planning years by grade (and geographic location if necessary) and cost escalation factors (projected rates of change). Examples of escalation factors would be, for example, projected rates of increase for wages and costs of material in the construction industry.

Once the resource requirements for each program have been developed, enrollment projections will be fed into the program profile for a period of five planning years. In other words, the "work" of the Virginia Beach City School System over five years will be simulated. It is important to say a word here about this simulation activity.

Within the constraints of an unchanging program profile, and predictably changing student populations and factor prices, the school system will be "operated." That is, it will "hire" teachers, "clean" classrooms,

"build" schools, etc., where necessary for a period of five years.

Graphs in this activity will include those for quantities of each resource, the dollar costs of each resource, a graph of total operating costs, and one of total capital costs, all over a five year horizon.

. . . Activity III: Establish a Profile of Resource Demands Under the 45-15 Plan.

This activity is much like Activity I in that the profiles of each program will be determined in order to develop resource demands, and resource costs for each program. The same types of information are gathered as a result of this activity as were gathered to accomplish Activity I. The major difference in the 45-15 plan will be reflected in the different data generated for each type of information, e.g., fraction of year taught. (If the curricular offerings under the 45-15 plan are identical to those under the traditional program except for the schedule it does not necessarily follow that all of the data, except scheduling data, will be the same.)

. . . Activity IV: Extrapolate Resource Demands Based Upon the 45-15 Program Profile.

Much like Activity II grows out of Activity I, Activity IV grows out of Activity III. The same enrollment projections and escalation factors developed in Activity II will be used to project the resource demands (quantity, type, and related dollar costs) upon the school district under the 45-15 plan. Again, in completing the overall design, Activity IV will make it possible to generate a "dotted line" projection for each resource considered.

Graphs in this activity will include those four quantities of each resource, dollar costs of each resource, a graph of total operating costs,

one of total capital costs, all over a five year horizon. Within this contest, there will be two levels of projections. One will be limited to those schools which have undertaken the 45-15 plan. The second level of projection will be based on the assumption that the 45-15 plan has been fully implemented throughout the district.

. . . Activity V: Develop "Balance Sheets" to Compare the Profiles of the Traditional Plan and the 45-15 Plan.

Following the development of profiles for each of the two alternative plans (Activities I and III), it will be possible to compare them. In order to make relevant comparisons, the one-year projection of resource demands of the traditional plan will be compared to the resource demands of the first operational year of the 45-15 plan (i.e., so that the same years will be compared). A "balance sheet" of "gains" and "losses" of the 45-15 plan against the traditional plan will provide the general format for this activity.

Within this context, there will be two levels of comparison. As in Activity IV, one level will be limited to those schools which have undertaken the 45-15 plan. From these comparisons, an estimated balance sheet will be developed for the whole district (second level). Each level of analysis will include comparisons of profiles, resource demands, and resulting dollar costs.

. . . Activity VI: Develop "Balance Sheets" to Compare the Five-Year Projected Resource Demands Upon the School District of the Traditional Plan and the 45-15 Plan.

This activity will take a form similar to that involved in Activity V, except that the comparisons are for the fifth planning year, as outlined in Figure D.

As in Activity V, there will be two levels of comparison related to

accomplishing Activity VI. One will be limited to those schools which have undertaken the 45-15 plan. From these comparisons, an estimated balance sheet will be developed for the whole district (second level). Each level of analysis will include comparisons of profiles, resource demands, and resulting dollar costs.

. . . Activity VII: Summarize in comparative terms the effect on the annual operating and capital budgets of the 45-15 Program against traditional schooling. This analysis will take into account the profiles developed as a result of the previous six activities. As a result, the analysis performed and described in Activity VII should allow the Virginia Beach City Public Schools to assess the impact of the 45-15 Program on the annual operating and capital budgets for the test year of the 45-15 Program. Further, the analysis provided in Activity VII will attempt to estimate the impact on the annual operating and capital budgets of the school system if the experimental 45-15 Program were extended to the other parts of the school system. The analysis will show the impact at graduated levels up to the entire system performing on the 45-15 Program. Finally, the analysis here will show the impact of the 45-15 Program during the test year and projected during a five year period afterwards at various incremental levels of usage in comparison with costs generated by the traditional schooling alternatives.

Evaluation of Parental Attitudes Toward the Virginia Beach 45-15 Pilot Project

Research Agent: Schlechty Associates of Chapel Hill, North Carolina

Principal Investigator: Phillip C. Schlecty

Excerpts from Research Proposal:

The following survey design is intended to determine the incidence, distribution, and interrelations of the attitudes toward and information about the 45-15 program in Virginia Beach, Virginia. Specifically, the research will be restricted to four attendance districts that contain designated pilot schools and to the following general questions:

1. How extensive and accurate is parental information concerning the 45-15 program?
2. Prior to actual experience with the program what are the parental attitudes toward the 45-15 program?
3. What are parental attitudes toward the 45-15 program after experience with the program?
4. What is the nature and degree of parental attitude change toward the 45-15 program after experience with that program?

PROCEDURES

Sampling

The total number of parents having children attending the schools

involved in the 45-15 program in each of the four attendance districts constitutes the population of this study, i.e., we are dealing with four separate and definable populations. Additionally, a 20 percent randomly selected sample of parents in two comparison schools will constitute the control population.

Data Collection

The necessity to reach a relatively large number of people and obtain specific data dictated the use of questionnaires. The major problem, non-response, with questionnaires will be minimal in this survey. First, the nature of the cover letter and the call back procedure helps assure us of a high return rate. Second, the fact that some data will be available on nonrespondents and the limited number of variables under treatment makes possible the use of data processing and statistical inference procedures to assess the extent to which the obtained responses deviate from the desired one.

A pilot study will be conducted to pretest all the research instruments used in this survey. The instruments used to assess the accuracy and extensiveness of information concerning the 45-15 program will be evaluated to determine both content validity and criterian-related validity. The program's information releases will be used to establish content validity. Analysis of the pilot study will provide the data that this instrument does discriminate. Specialists working with the 45-15 program can provide the necessary criterion by which the data from respondents can be evaluated in terms of extensiveness.

Since variations in responses at a particular time and variations from time to time are a part of this research the only reliability test

needed is one to evaluate variations arising out of the particular sample of tasks chosen to represent areas of attitudes and information. The questionnaire will have a relatively large number of items and it is in no way a speed test. Therefore, reliability will be established by subdividing the instrument; i.e., we will use a split-half reliability coefficient. In addition, since we are dealing in each category with average or group responses the reliability will be higher than it would be with individual responses.

Phase I:

Phase I of the survey analysis will deal with the first two general questions of the study, i.e., How extensive and accurate is parental information concerning the 45-15 program? and Prior to actual experience with the program what are the parental attitudes toward the 45-15 program?

The data related to each of these major questions will first be reported in terms of general trends throughout the attendance districts and secondly the data will be reported by each attendance district. The major questions will be specified and the data reported in three major categories:

(1) How extensive is parental information concerning the 45-15 program;

(2) How accurate is parental information concerning the 45-15 program; and

(3) Prior to actual experience with the 45-15 program what ate the parental attitudes toward the program.

Phase II:

In Phase II the entire analysis process will be repeated. Then the data obtained in Phase II will be compared to the data obtained in Phase I. From this comparison an analysis will be given in terms of the nature and amount of change in the following categories: extensiveness of parental information, accuracy of information, and parental attitude toward the 45-15

program. In addition, in this phase of the research a fourth control variable will be used in the analysis; are parental attitudes affected by having children who are changing school districts.